

Jay M. Vincelli

EDUCATION- **B.Sc, Materials Science and Engineering**, University of Florida, Gainesville, Florida, May 2007.
M.Sc, Engineering Sciences, Dartmouth College, Hanover, New Hampshire, June 2013.

Jay M Vincelli, M.Sc, is an experienced multi-discipline engineer specializing in computational analysis of biomechanical implants and aviation components, fracture analysis, and chemical and metallurgical analysis of steel, aluminum, titanium, and nickel-based alloys. He is actively involved in engineering analysis, design, product development and research. He earned his Bachelor of Science in Materials Science & Engineering from the University of Florida and his Master of Science in Engineering Sciences from Dartmouth College, where he developed a computational method for quantifying wear in metal-on-metal hip retrievals and analyzed over 500 failed hip components. He has filed for a provisional patent covering a miniaturized cardiopulmonary bypass circuit for transgenic mouse testing. He is the author of a peer reviewed publication on a study of laser cleaning and pulsed gas tungsten arc welding of titanium alloy tubes. His collaborative work has been published with investigators at the University of Virginia Department of Electrical and Computer Engineering and the U.S. Naval Air Warfare Center in Cherry Point, NC.

CERTIFICATIONS - Six Sigma Green Belt, Hazardous Waste, Laboratory Safety, Blood Borne Pathogens (Dartmouth)

AWARDS & HONORS - 1) 2012 John C. Woodhouse Engineering Design prize for innovation and ingenuity in developing the most inexpensive but effective experimental research equipment, 2) Particle Engineering Research Center Undergraduate Research Scholarship, 3) 2012 Thayer Visionaries in Technology Artistic Image Contest Winner.

EMPLOYMENT

Forensic Engineering Consultant, June 2013 to present, **MATERIALS SCIENCE ASSOCIATES, LLC**, East Greenwich, RI. Biomedical engineering, metallurgical, materials science & mechanical engineering consulting services for government, hospital, legal, insurance, medical, and manufacturing needs. Performs failure analysis, materials and process evaluations, biomaterial and medical implant design and testing, professional reports, oral presentations & expert opinions.

Engineering Researcher, Sept. 2011 to June 2013, Dartmouth Biomedical Engineering Center, Dartmouth College, Hanover, NH. Performed failure analysis on hip and knee implants. Developed numerical methods for quantifying wear in metal-on-metal hip retrievals. Developed numerical methods for quantifying the pore spacing in plasma-sprayed titanium coatings. Evaluated enzymatic degradation of OrthoSpace's rotator cuff balloon, which consisted of a polycaprolactone (PCL) and polylactic acid (PLA) polymer using FTIR, DSC, visco-elastic analysis and tensile testing to aid regulatory clearance.

Product Engineer and Project Manager, Nov. 2009 to Sept. 2011, Freudenberg-NOK, Northfield, NH. Managed multiple product launches from initial design to production launch, including design, validation and production verification testing, following APQP procedures and leading a multidisciplinary team. Performed failure analysis on automotive components. Designed rotary shaft seals, molds and components for injection/compression molding, finishing & inspection. Developed new test methods in collaboration with axle manufacturers for the testing of rotary shaft seals and set up and performed the testing in-house. Obtained training in lean systems and Six Sigma methodology while participating in major and minor kaizens and Six Sigma investigations.

Failure Analysis Engineer, June 2008 to Nov. 2009, U.S. Naval Air Systems Command (NAVAIR), Cherry Point, NC. Performed metallurgical analysis used to complete a multitude of failure analyses involving engine blades/vanes, foreign object damage, corrosion, aircraft structures, wire bundles, bolts & fasteners, gearboxes, circuit boards, and hydraulic/pneumatic tubing. Modernized the welder certification and inspection program; created process improvement updates to industry-wide, military-wide, Navy-wide, and local manuals/instructions and performed welding analysis and certification for Navy welders.

Application Engineer, June 2007 to June 2008, Elan Technology, Midway, GA. Supported 25 customers worth ~\$1 million annually through feasibility analysis, quoting, purchase orders, production, shipping, and technical support of glass and ceramic components in the electronics industry. Received training in the ISO/TS16949:2002 and AS9000 quality systems to perform as an internal auditor.

PARTIAL INVESTIGATION LIST

The following is a partial list of failure analyses Mr. Vincelli has investigated during his engagement with NAVAIR. The range of services provided included chemical analysis to identify the composition of the metal used, metallurgical analysis including hardness testing and electrical conductivity testing, and analysis of the fracture surface to identify if the component slowly failed due to fatigue, or if a sudden failure due to overload occurred. A brief description of the services provided is included below.

NAVAIR, Cherry Point, NC

- Boeing AV-8B Harrier II Jet, Aluminum Panel - metallurgical analysis
- Titanium Tube Welding Dross – Visual characterization
- Bell Boeing V-22 Osprey Aircraft, Shaft Driven Compressor (SDC) Inlet - aluminum metallurgical and mechanical analysis
- Lockheed C-130 Hercules Aircraft, Hydraulic Motor - chemical, metallurgical, and fracture analysis
- McDonnell Douglas F/A-18 Hornet, Tie Rod, Air Bearing Shaft, and Nut – chemical and metallurgical analysis
- Boeing AV-8B Harrier II Jet, Port Hot Nozzle from Universal Yoke Assembly – visual analysis of nut and bolt system
- Rolls-Royce Pegasus Aircraft Turbofan (F-402), Compressor Blade - foreign object damage analysis
- Sikorsky CH-53E Super Stallion Helicopter, Main Gearbox Housing – chemical and fracture analysis
- Sikorsky CH-53E Super Stallion Helicopter, Rescue Hoist – chemical, metallurgical, and fracture analysis
- Bell Boeing V-22 Osprey Aircraft, Circuit Board Diode – visual analysis
- Bell Boeing V-22 Osprey Aircraft, Hydraulic Tube Assembly, Swage Fitting – dimensional, chemical, and visual analysis
- Sikorsky MH-60S Knighthawk Helicopter, Main Gearbox Dipstick Rivets – dimensional analysis
- Boeing AV-8B Harrier II Jet, F-402-RR-408B Engine, Low Pressure Compression Rotor Blades – foreign object damage, chemical and dimensional analysis
- Boeing AV-8B Harrier II Jet, Landing Gear Nitrogen Line – tube thread dimensional and visual analysis
- Boeing AV-8B Harrier II Jet, Web, Cascade Assembly – dimensional, chemical, metallurgical, and fracture analysis
- Sikorsky CH-53E Super Stallion Helicopter, Cargo Ring – chemical, metallurgical, and fracture analysis
- Boeing AV-8B Harrier II Jet, Hydromechanical Unit Wiring – dimensional and fracture analysis
- General Electric T-64 Turboshift Helicopter Engine, Stage 1 Vane, Blade, and Inlet Guide Vane – dimensional, chemical, and visual analysis
- C-130 Trailing Edge Strip – chemical, corrosion, metallurgical, analysis
- McDonnell Douglas F/A-18 Hornet, Cooling Turbine Wheel and Housing – dimensional, chemical, metallurgical, fracture analysis
- Sikorsky MH-60S Knighthawk Helicopter, Air Cycle Machine (Turbine Shaft Bearing, Compressor and Turbine Wheels, Compressor Housing, Cooling Fan, and Fractured Blade) – chemical, metallurgical, and fracture analysis
- Rolls-Royce Pegasus Aircraft Turbofan (F-402), Nut Plate/Anchor Nut – chemical and metallurgical analysis

- General Electric T-64 Turboshift Helicopter Engine, Stage 1, 2, 3, 4, and 6 compressor blades, Stage 1 retaining ring – foreign object damage, chemical, metallurgical, and fracture analysis
- Sikorsky SH-60B Seahawk, Engine Coupling Retainer Bolt, Shaft Screw, Unitorque Nut – Chemical, metallurgical, and fracture analysis
- Boeing AV-8B Harrier II Jet, RCS Duct Fastener Bolt – Chemical analysis

RESEARCH PUBLICATIONS

Vincelli JM, Development of Contact Metrology and Numerical Methods for Quantifying and Locating Wear in Metal on Metal Hip Retrievals, Master's Thesis, Dartmouth, Hanover, NH, May 2013.

Kumar, A., Sapp, M., **Vincelli, J.**, & Gupta, M.C. (2010). A study on laser cleaning and pulsed gas tungsten arc welding of Ti-3Al-2.5V alloy tubes. Journal of Materials Processing Technology, 210(1), 64-71. doi:10.1016/j.jmatprotec.2009.08.017.

ABSTRACTS

Vincelli JM, Carlson EM, Currier JH, McHugh DJ, Van Citters DW, Collier JP. Methodology and validation of taper wear measurements in hip arthroplasty retrievals. 59th Annual Meeting of the Orthopaedic Research Society. San Antonio, TX, 2013.

Vincelli JM, Tomek IM, Berton C, Carlson EM, Van Citters DW. Optical profilometry comparison of the US and International ongrowth surface of a monoblock acetabular design. 59th Annual Meeting of the Orthopaedic Research Society. San Antonio, TX, 2013.

Carlson EM, Currier JH, Currier BH, McHugh DJ, Mayor MB, **Vincelli JM**, Collier JP. Retrieved MoM implants provide evidence for hip distraction during swing phase. Annual Meeting of the American Academy of Orthopaedic Surgeons. Chicago, IL, 2013.

SEMINAR PRESENTATIONS

Invited Speaker: Numerical Methods for Quantifying Wear in Metal-on-Metal hip retrievals
Seminar on Surface Metrology for the Americas 2012

PATENT APPLICATIONS

US Provisional Patent Application #61766153,
 "Miniaturized cardiopulmonary bypass circuit for a mouse model,"
 By: Jay Vincelli, David McClatchy, Stephanie Wolf, Ryan Halter (PhD),
 and James Yun (MD)

This invention relates to cardiopulmonary bypass devices and more particularly to such devices employed in cardiopulmonary bypass surgery for small mammals.